Historic, archived document
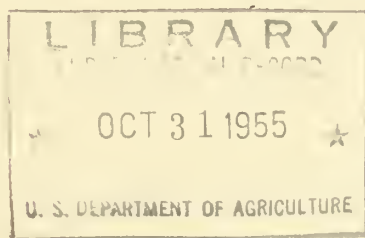
Do not assume content reflects current scientific knowledge, policies, or practices.

The Impact of

FEDERAL INCOME TAXES

on Farm People

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Washington, D. C.   July 1955

CONTENTS

THE IMPACT OF FEDERAL INCOME TAXES ON FARM PEOPLE [1]

Frederick D. Stocker, Agricultural Economist
Production Economics Research Branch
Agricultural Research Service

INTRODUCTION

In 1913, when the Federal income tax was first enacted, its impact was felt by only a small proportion of the population. Exemptions were high, and rates, compared with those applied in more recent years, were low. In 1914, only 358,000 individual income tax returns (with net income) were filed, and tax liabilities reported on these amounted to $41 million. By 1940, the total number of such returns had grown to 14,665,000, and reported liabilities to $1,496 million. In 1952 more than 56 million returns were filed. They represented tax liabilities of more than $28 billion.[2]

The income tax laws of many foreign countries provide special treatment for income obtained from agriculture. In some countries farm income is taxed at preferential rates; in others it is completely exempt. In the United States, however, income from agriculture is subject to the same rates and in general to the same provisions that apply to other forms of income. Nevertheless, until fairly recently, because of low farm income and the high personal exemptions provided in the law, few farm families have had to pay Federal income taxes. Not until 1940 was farm income large enough in the aggregate to result in taxes of measurable size. Federal income tax payments of farm people in 1941, principally on income earned in 1940, are estimated at approximately $15 million.

On 1953 incomes, Federal income taxes of the farm population amounted to about $1,430 million, most of which was paid in the calendar year 1954. This amount represents roughly $63 per capita of the farm population and about 6.9 percent of farmers' net income received in 1953 from all sources. In that year, Federal income taxes of farm people came to more than half again as much as the taxes levied on all farm real estate by State and local governments.

---

[1] Selma F. Goldsmith and Maurice Liebenberg, of the Office of Business Economics, Department of Commerce, supplied much valuable advice, particularly on the construction of an income-size distribution for the farm population and on estimating taxes due on the larger incomes. Ernest W. Grove, of the Agricultural Marketing Service, contributed suggestions on the use of data on farm income. Responsibility for the interpretations and conclusions, however, rests entirely on the author.

[2] United States Treasury Department, Bureau of Internal Revenue, Statistics of Income for 1948, Part I, pp. 184-185, and Statistics of Income for 1952, Part I, Preliminary Report, p. 9.

Federal income tax payments of the farm population from 1941 to 1955 are listed below:

Year of payment	Tax [1]
	(Million dollars)
1941	.15
1942	85
1943	400
1944	880
1945	1,090
1946	1,060
1947	995
1948	1,365
1949	965
1950	825
1951	865
1952	1,185
1953	1,400
1954	1,430
1955	1,120

[1] Figures rounded to nearest 5 million dollars. Payments primarily on income received in preceding year.

The estimates in the tabulation represent Federal income taxes paid by the farm population, and are not necessarily the same as taxes on income from farming or those on the income of farm operators. The basis for the estimates is the total money income received by people whose place of residence is classified (according to the Census of Population) as "rural farm." The income concept includes the nonfarm income received by farm people, as well as their income from farming. But income received from farming by people who do not live on farms is not included. Nor is the income of people whose place of residence is classified as "rural nonfarm."[3] In short, the criterion according to which a given type of income is or is not included is the classification of the recipient of the income, not of the income itself.

One should note also that these estimates of Federal income taxes are based on the amount and distribution of all income received by the farm population. The estimating procedure involves first a computation of the tax liabilities that would be required of farm people if all income legally subject to tax were actually reported on tax returns.[4] Necessary adjustments are then made to convert this estimate into one of tax liabilities actually reported and paid.

[3] Income of farming corporations is also excluded. See p. 19.
[4] The estimating procedure is explained in full starting on p. 15.

Aside from the possibility of evasion, there are several reasons why the aggregate tax liability reported by the farm population may be expected to fall short of the full amount of "computed liabilities." First may be mentioned the frequent inadequacy of farmers' accounts and records. Particularly among lower income farmers there is probably imperfect compliance with the income-tax regulation that requires the keeping of records sufficient to determine the amount of income received. The irregular nature of farm income and the large proportion received in cash (rather than by check) work also against the maintenance of complete and accurate accounts. Further, the intermingling of personal with business expenses, as is commonly found in farm businesses, requires skill no less than that of the professional cost accountant if taxable income is to be calculated accurately.

Another reason for expecting underreporting to be common among farm people relates to the generally low level of farmers' incomes. Although some enforcement effort is devoted to the smaller incomes, analyses of audit results by the Internal Revenue Service have revealed greater productivity when examination time is spent on returns with larger incomes. As most farmers' incomes fall in the lower brackets, their returns probably receive a smaller amount of enforcement effort. There is evidence, nevertheless, that recent years have seen considerable improvement in proper reporting of Federal income taxes by farm people.

Finally, most farm people did not become subject to Federal income taxes until the onset of World War II. Thus, for much of the period under consideration, farm people were just becoming accustomed to their new obligations as taxpayers. It is appropriate, therefore, to make some allowance for underreporting or nonreporting as a result of unfamiliarity with income tax procedures on the part of newly taxable farmers.

On the other side of the picture are several considerations that suggest overreporting and overpayment of taxes among some farm people. Many farmers, for example, may be unaware of allowable deductions, or they may fail to claim refunds on taxes withheld on wages from nonfarm employment. On balance, however, underreporting of income is assumed to be more usual.[5]

THE CHANGING IMPACT OF FARM INCOME TAXES

As noted earlier, Federal income tax payments of farm people in years preceding 1941 are assumed to be negligible. Since then, however, the increase has been large. The sharpest rise occurred between 1941 and 1948. From an estimated $15 million paid in 1941 on income received in 1940, Federal income taxes of the farm population increased each year during World War II. Payments in 1946, on 1945 income, showed a slight decline. Another small drop occurred in 1947, but payments in 1948, on 1947 income, climbed to $1,365 million. Thereafter, taxes fell substantially until the outbreak of the Korean war, when they again increased. The amounts paid in 1954 (on 1953 income) were the largest ever recorded. They totaled $1,430 million. Payments of farm people on 1954 income, due largely in 1955, are estimated from preliminary data at $1,120 million, or about 74 times those of 1940.

[5] The adjustment of computed liabilities to allow for underreporting of income is described starting on p. 28.

The increase in income taxes of farm residents between 1941 and 1948 reflects in part the lower exemptions and higher rates that characterized the Federal income tax in the war years. On 1940 income, for example, no tax was required of a single person with adjusted gross income of less than $800, or of a married couple with less than $2,000. In that year a married couple with two dependents and an adjusted gross income of $5,000 would have paid about $48 in Federal income taxes. By 1947, in contrast, the personal exemption had been lowered to $500 per person, and the same family with the same income would have paid $485 in Federal income taxes.6/

The increase between 1940 and 1947 in tax payments is attributable also to the growth in farm income in this period. Net income of the farm population from agricultural sources increased from $5,299 million in 1940 to $16,467 million in 1947, a rise of 211 percent. The increase in incomes of farm people from nonfarm sources was somewhat less. It amounted to about 81 percent. From 1940 to 1947, total net income of the farm population rose 167 percent - from $7,999 million to $21,367 million. In the same period, estimated taxable income rose from $5,886 million to $19,609 million, an increase of 233 percent.7/ Moreover, this increase in income was accompanied by a decline in the number of persons on farms and in the number of taxpaying units. As a result, the increase between 1940 and 1947 in taxable income per taxpaying unit amounted to 241 percent - slightly larger than the increase in the aggregate.

The unprecedented amount of Federal income taxes paid by farm residents in 1948 resulted partly from the fact that in 1947 taxable income reached an all-time peak. Likewise, tax rates, although they were reduced slightly from World War II levels by the Revenue Act of 1946, applied at relatively high rates to 1947 incomes.

In 1948, the combination of a slight decline in their taxable incomes (though not in net income, because of the increase in value of farm

----

6/ Both calculations assume nonbusiness deductions of 10 percent of adjusted gross income, and that for 1940 assumes the maximum credit for earned income. If one keeps in mind the extent to which the general price level rose during this period, the impact of the decrease in the exemption level and the increase in rates is even more striking.

7/ The term "taxable income" is used here in the sense of income after deduction of business expenses but before deduction of personal exemptions and nonbusiness deductions. It corresponds to the term "adjusted gross income" used by the Internal Revenue Service. "Taxable income" is distinguished also from "net income" of the farm population by the exclusion of (1) nonmoney items and (2) the net income of corporate farms. The reconciliation of these two concepts for 1952 is as follows:

Item	Million dollars
Net income of the farm population	22,579
Less nonmoney income (including change in value of farm inventories)	4,522
Plus noncash wages paid to nonresident farm workers	84
Less corporate farm net income	76
Equals estimated taxable income of the farm population	18,065

inventories) together with the sizable rate reductions and the split-income
provision enacted in the Revenue Act of 1948, brought income tax payments of
farm people in 1949 down sharply to about $965 million. The continued down
ward course of taxable income in 1949 brought some further decline in taxes
paid in 1950. In that year, however, the decline in income was slightly
overbalanced by the emergency increase in tax rates that went into effect late
in the year following the Korean outbreak. Payments in 1951, therefore,
showed some increase.

Taxable income for both 1951 and 1952 was well above that for 1950.
Higher farm' income, together with the successive rate increases of the Korean-
war years caused Federal income tax payments greatly to exceed those of 1951,
although they remained below the 1948 peak. In 1954, total payments reached
their highest level - $1,430 million. In 1955, with tax rates reduced and
estimates of farm income down, income tax payments of the farm population on
1954 income are estimated at about $1,120 million, a drop of some $310
million from the preceding year.

FARM INCOME TAXES IN CONSTANT DOLLARS

The long-run increase in Federal income tax payments of farm people may
be regarded partly as an apparent, rather than a real, addition to the tax
burden. When a rise in farm income accompanies general inflation, the addi-
tional taxes on this increased income are to some extent a result merely of a
change in the unit of measurement.

The progressive structure of Federal income tax rates, however, which
gives the tax its characteristic "built-in flexibility," causes the change in
tax liabilities always to be more than proportional to the change in income
from which it stems. Thus a general price rise, in which farm income moves
upward in exact proportion to all other forms of earnings, must result in
some increase in real payments for Federal income taxes. This is true even
in the absence of increases in tax rates, although the period in which income
taxes of farm people increased most was in fact also one of recurring increases
in rates.

Table 1 shows the net income (before taxes), Federal income tax payments,
and net disposable income of the farm population expressed in both current and
constant dollars having 1910-14 purchasing power. In general, the pattern of
increases and decreases that emerges from the original data on tax payments is
reflected also in the payments after deflation into dollars of constant pur-
chasing power. In the deflated data, however, Federal income taxes of the farm
population are seen to decrease from 1950 to 1951, whereas the unadjusted
series shows an increase for these years. Also, translation of the data into
constant dollars reveals that the purchasing power of the Federal income taxes
paid by farm people was greater in 1945 than in either 1954 or 1948, and it
magnifies the real burden in the later years of World War II as compared with
the Korean-war years.

FEDERAL INCOME TAXES PER CAPITA OF THE FARM POPULATION

Since 1940 the farm population has declined markedly. In 1940 it is
estimated to have numbered 30,547,000. A drop of slightly more than 5 million

Table 1.- Net income, Federal income tax payments, and net disposable
income of the farm population, in current and in constant
dollars, income years 1941-55

Income year	Current dollars			Index of prices paid by farmers for family living 1910-14=100	Constant dollars		
	Total net income 1/	Tax payments 2/	Net disposable income 3/		Total net income 1/	Tax payments 2/	Net disposable income 3/
	Million dollars	Million dollars	Million dollars		Million dollars	Million dollars	Million dollars
1941--	10,490	15	10,475	130	8,070	12	8,058
1942--	14,967	85	14,882	149	10,045	57	9,988
1943--	17,000	400	16,600	166	10,241	241	10,000
1944--	17,479	880	16,599	175	9,988	503	9,485
1945--	17,641	1,090	16,551	182	9,693	599	9,094
1946--	20,036	1,060	18,976	202	9,919	525	9,394
1947--	21,367	995	20,372	237	9,016	420	8,596
1948--	23,971	1,365	22,606	251	9,550	544	9,006
1949--	19,919	965	18,954	243	8,197	397	7,800
1950--	20,494	825	19,669	246	8,331	335	7,996
1951--	23,427	865	22,562	268	8,741	322	8,419
1952--	22,579	1,185	21,394	271	8,331	437	7,894
1953--	20,718	1,400	19,318	270	7,673	518	7,155
1954--	20,095	1,430	18,665	274	7,334	522	6,812
1955--	---	1,120	---	---	---	---	---

1/ Includes nonmoney income, value of net change in inventory, and income
from nonfarm sources.

2/ Based on income received in preceding year.

3/ Strictly speaking, disposable income should be net also of income tax
payments to State governments and several other minor tax and nontax payments.
Although no allowance is made here for these items, the amounts of such pay-
ments by the farm population are probably small.

persons on farms occurred during World War II. Despite a temporary recovery of
about 2 million in the years immediately following the war, by 1950 the farm
population had fallen to an estimated 25,058,000.8/ The latest estimates indi-
cate that the downward trend has continued since 1950.

This decline in farm population is important if one is to understand the
changing impact of Federal income taxes. It is apparent that with a declining
population, a constant or even a declining aggregate income is consistent with
rising per capita income and an increasing average tax payment. Thus, table 2

8/ These estimates are adjusted for comparability to take account of the re-
vised definition of the farm population that was introduced with the 1950 Census
of Population.

shows that, although the peak year for aggregate taxable income was 1947,[9] on a per capita basis taxable income was greater in each of the last 4 years for which estimates are shown, and that it was largest in 1953. Taxes paid per capita are also seen to have exceeded those paid on 1947 income in each income year since 1952.[10]

Table 2.- Taxable income and tax payment per capita of the farm population, income years 1940-54

Income year	Tax payments due [1]	Taxable income of the farm population	Farm population	Taxable income per capita	Tax payment per capita
	(1)	(2)	(3)	(4)	(5)
	Million dollars	Million dollars	Thousands	Dollars	Dollars
1940----	15	5,886	30,547	193	[2]
1941----	85	7,944	30,273	262	3
1942----	400	11,334	29,234	388	14
1943----	880	14,270	26,681	535	33
1944----	1,090	14,933	25,495	586	43
1945----	1,060	14,882	25,295	588	42
1946----	995	16,594	26,483	627	38
1947----	1,365	19,609	27,124	723	50
1948----	965	18,729	25,903	723	37
1949----	825	17,142	25,954	660	32
1950----	865	16,037	25,058	640	35
1951----	1,185	18,321	24,160	758	49
1952----	1,400	18,065	24,283	744	58
1953----	1,430	17,725	22,679	782	63
1954----	1,120	16,157	21,890	738	51

[1] Taxes due on income of each year are assumed to be paid in the following year.
[2] Less than $0.50.

In figure 1, a comparison is made between estimated tax payments per capita of the farm population and the per capita liabilities reported to the Internal Revenue Service on returns of the entire population. Although the concepts differ slightly, and comparisons of absolute magnitudes should therefore be avoided, the data are nevertheless thought sufficient to support a comparison of proportionate changes. The diagram is plotted on semilogarithmic paper to facilitate such a comparison.

[9] Net income reached its highest point in 1948.
[10] Tax rates were generally higher on 1952 and 1953 income, but they were partly offset by the split-income provision that first applied to 1948 income.

Per Capita of Population

FEDERAL INCOME TAXES
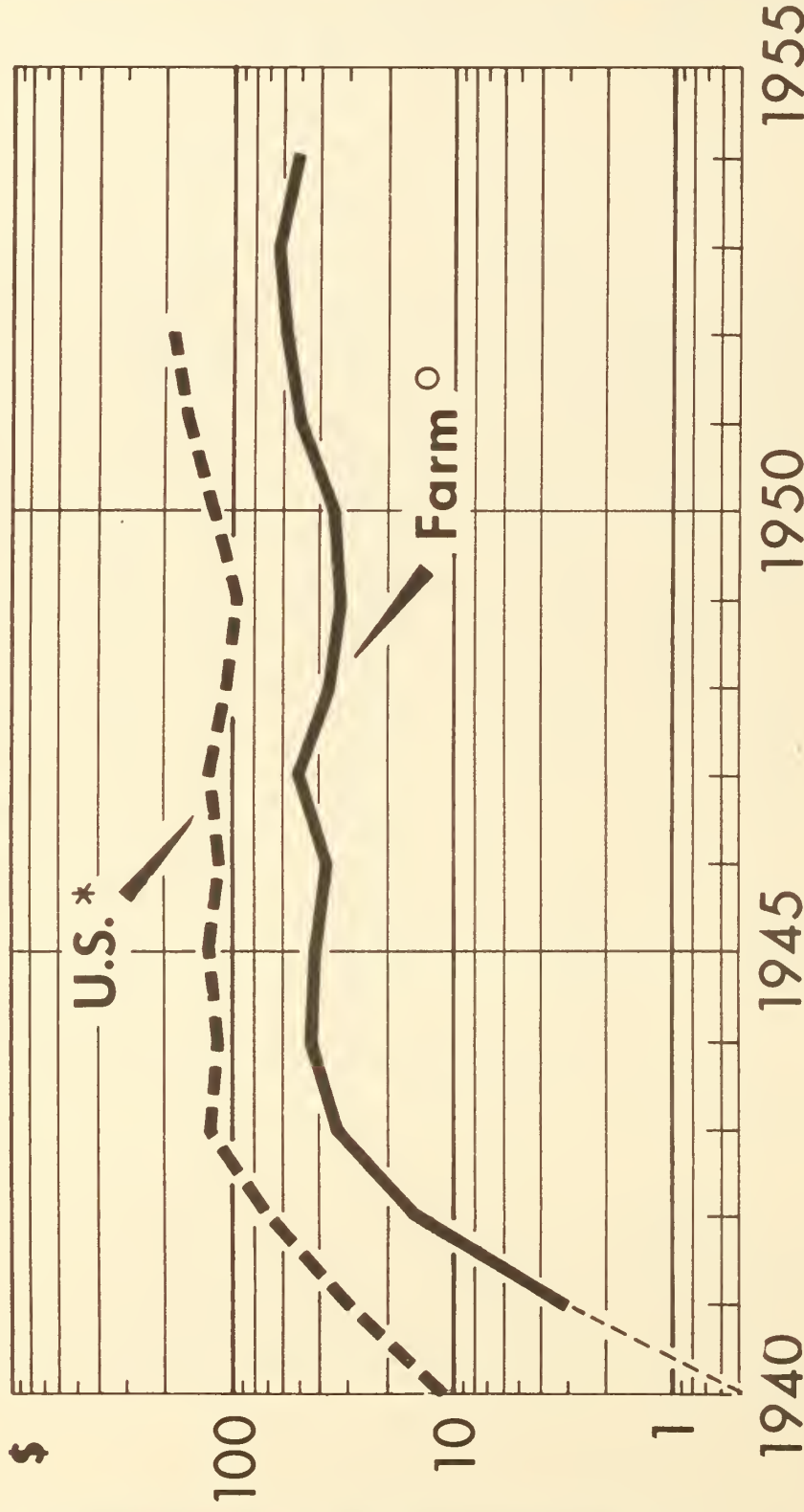
DATA ARE FOR INCOME YEARS
* LIABILITIES REPORTED BY INTERNAL REVENUE SERVICE   ○ ESTIMATED PAYMENTS

U. S. DEPARTMENT OF AGRICULTURE   NEG. 55 (5)-715   AGRICULTURAL RESEARCH SERVICE

Figure 1.- In the early years of World War II, Federal income tax payments per capita of the farm population increased more rapidly than the reported liabilities of the population at large. In the postwar period, they fluctuated somewhat. During the Korean war, these taxes increased at about the same rate as did the per capita Federal income taxes of the entire population.

Three aspects of figure 1 merit comment. First, the Federal income tax payments of the farm population apparently are subject to sharper fluctuations than the reported liabilities of the population at large. This is partly a reflection of the greater variability in farm income, as shown, for example, in the year-to-year changes between 1946 and 1949. In part also it reflects the fact that, because farm incomes consistently average lower than nonfarm incomes and therefore lie closer to the exemption level, even small variations in farm income may be magnified into sharp fluctuations in tax payments.

The second noteworthy aspect is the increase between 1940 and 1944 in taxes of farm people relative to those of the total population. During World War II, farmers' incomes increased as a percentage of the national average,[11] largely because of the greater cyclical variability in prices of farm products as compared with the products of industry. Starting from low prewar levels, farmers' incomes showed their greatest increase in the same period in which tax rates were raised and exemptions reduced so as to tap more heavily the lower incomes. The result of these combined influences was that Federal income tax payments of farm people increased more rapidly than did those of the rest of the population.

Third, and related to the aspect just noted, is the narrowing of the gap between the average Federal income tax payment of farm and nonfarm people. Comparisons of absolute levels must be avoided because of the nature of the data. Nevertheless, the long-run increase in the per capita taxes of farm people relative to those of the population at large is evident. But this development must be kept in perspective. The period covered includes only 15 years, and complete data are available for only 13. The period is also one that by almost any definition must be regarded as abnormal. The narrowing of this gap, therefore, may be merely a passing phenomenon. However, the data for years since 1949 apparently indicate that the increase in per capita payments of farm residents for Federal income taxes has kept pace with that of the total population.[12]

RELATION OF TAX PAYMENTS TO INCOME OF THE FARM POPULATION

In table 3, the estimated payments of the farm population for Federal income taxes are compared with (1) taxable income and (2) net income from all sources. The ratios, which for this purpose are related to the income year rather than to the year of tax payment, showed a strong increase in each year of World War II until 1945. In that year a slight decrease occurred as a result of a small drop in aggregate taxable income.

The ratio of income taxes to taxable income and to net income continued to reflect changes in total tax payments of farm people until the income year 1949. In that year, a decline in tax payments was associated with an increase in the ratio of payments to net income. The explanation is found in the

[11] In 1940, average per capita income of the farm population was 44 percent of the national average; in 1944 it was 58 percent of the average. See U. S. Agr. Marketing Service, The Farm Income Situation, September-October 1953, p. 25.
[12] Since 1951, aggregate (though not average per capita) taxable income of the farm population has declined steadily, while the trend in that of the population at large has been upward.

almost unprecedented increase in 1948 in farm inventories - an item that enters into a farmer's net income but not into taxable income.13/ In 1949 inventories dropped sharply. Again in 1952 farm inventories increased greatly; a year later there followed a decline. This decline helps to account for the increase in the ratio of tax payments on 1953 income to income of that year - an increase, however, that must be attributed primarily to the rise in aggregate tax payments.

It is apparent from the data in table 3 that variations in the effective tax rate applicable to taxable income (that is, the ratio of tax payments to taxable income) do not always parallel changes in the ratio of payments to net income. The cause of divergence in the two ratios is found in the non-money components of farmers' net incomes, of which the most variable item is the net change in farm inventories.

Persons who receive income from farming are often in a peculiar position in the extent to which inventory changes cause taxable income to differ from net income. Among operators of small unincorporated businesses, it is difficult to think of any group that experiences such wide fluctuations in inventories as those characteristic of the farm business. Among corporate taxpayers, where inventory changes are likely to be a large item, more highly developed bookkeeping techniques make accrual accounting feasible to firms that wish to relate their tax liabilities more closely to net income.

Although an accountant may be able to advance cogent arguments for tying income taxes more closely to net income, inclusive of inventory changes, a farmer is likely to be more impressed with the importance of having cash income with which to pay his taxes as they come due. Therefore, most farm operators, particularly those whose inventories are likely to vary widely from year to year, do not look favorably on bookkeeping methods that take account of inventory changes in arriving at tax liabilities. This reason, together with the greater complexity of accrual accounting, probably explains the almost universal adherence of farmers to cash-basis accounting.14/

FARM INCOME TAXES IN RELATION TO FARM PROPERTY TAXES

For many years studies of farm taxation have emphasized property taxes and their impact on farm operators. That this is true is apparent from a casual survey of bulletins published by State colleges and experiment stations, and of other research in the field of agricultural taxation. Studies cover nearly every conceivable aspect of property taxation. On the subject of the income tax and its impact on farming and farm people, however, published material is scarce.

This preoccupation with property taxation almost to the exclusion of studies of income taxation is, if not justifiable, at least explainable. The cause is to be found partly in the attitudes of research personnel, who often believe that they can influence property tax laws and administration in their

---

13/ As used here, the net change in value of inventories means the physical change in inventories, valued at year-end prices.
14/ The greater advantage open to the cash-basis taxpayer in connection with income from sales of draft, breeding, or dairy livestock is another reason.

Table 3.- Federal income taxes of the farm population, as percentage
of taxable income and of net income, income years 1940-54

Income year	Tax payments due 1/	Taxable income of farm population	Net income of farm population	Tax payments as percentage of		Change in tax rates from pre-ceding year
				Taxable income	Net income	
	Million dollars	Million dollars	Million dollars	Percent	Percent	
1940--	15	5,886	7,999	0.3	0.2	Raised
1941--	85	7,944	10,490	1.1	.8	Raised
1942--	400	11,334	14,967	3.5	2.7	Raised
1943--	880	14,270	17,000	6.2	5.2	Raised
1944--	1,090	14,933	17,479	7.3	6.2	Raised
1945--	1,060	14,882	17,641	7.1	6.0	No change
1946--	995	16,594	20,036	6.0	5.0	Lowered
1947--	1,365	19,609	21,367	7.0	6.4	No change
1948--	965	18,729	23,971	5.2	4.0	Lowered
1949--	825	17,142	19,919	4.8	4.1	No change
1950--	865	16,037	20,494	5.4	4.2	Raised
1951--	1,185	18,321	23,427	6.5	5.1	Raised
1952--	1,400	18,065	22,579	7.7	6.2	Raised
1953--	1,430	17,725	20,718	8.1	6.9	No change
1954--	1,120	16,157	20,095	6.9	5.6	Lowered

1/ Taxes due on income of each year are assumed to be paid in the following
year.

home States more readily than they can the tax system of the Federal Govern-
ment. Thus they tend to address themselves primarily to problems of State or
local taxation.

A second cause lies in the nature of the farm business itself, which
requires a large investment in property, especially in real estate. Histori-
cally, ownership of property has been one of the chief criteria of taxpaying
ability. Further, real property and to a lesser extent tangible personalty
are readily detected and so present an inviting target to the tax gatherer.
Because of this, farmers are especially vulnerable to the property tax, and
they have a special interest in studies designed to improve it.

The close attention given to property tax problems of farmers may also
be accounted for as a carryover from the time when property taxes occupied a
more prominent position in the family of taxes. In years past, when local
government was more important financially speaking than either State or
Federal government, the property tax was the only tax that bore significantly
on the farmer. Recent years, however, have brought a great increase in the
financial importance of the Federal Government in relation to that of the
States and localities. As a concomitant of this development, most farmer-
taxpayers now pay more in Federal taxes, particularly on income, than they pay
in local taxes.

The relative impact of Federal income taxes and farm real estate levies on farmers from 1940 through 1954 is shown in table 4. In the later years of World War II, income taxes paid by farm people amounted to more than twice the levies on farm real estate, and in the last several years they have been roughly half again as large as the amount of such levies.

AVENUES FOR FURTHER INQUIRY

A tax that requires annual outlays of upward of a billion dollars from the farm population can be expected to have far-reaching economic effects, especially when the year-to-year variations in amount are as marked as those in Federal income taxes. It seems apparent that valuable results might come from study of such questions as the effects of Federal income taxation on farmers' disposable incomes, living standards and buying habits, as well as its effects on farm-production plans.

The foregoing discussion makes clear the impact of Federal income taxes on farm net incomes. In recent years, estimated payments have been slightly in excess of 6 percent of net income. Farm budget studies obviously cannot afford to ignore financial liabilities of such magnitude. Indeed, some thought might well be given to such questions as these: How do farm people meet their tax payments? Is it through systematic saving in anticipation of the tax, or by prepayments on their estimated liabilities, or perhaps through a reduced level of expenditures in the period immediately preceding the due date for the tax? Moreover, the seasonal nature of farm income raises questions as to the problem faced by farmers in complying with the terms of the law. Attention might also be given to the compensatory action of the Federal income tax in reducing year-to-year fluctuations in farmers' disposable incomes. On the other hand, notwithstanding liberalized provisions for carrying losses forward or back, our tax system still penalizes a person whose income is variable. Farmers in particular should be concerned with the adequacy of existing carry-forwards and carrybacks to meet the disadvantage imposed by variability in income.

The production effects of Federal income taxation also merit study. Because of recent changes in the Internal Revenue Code, farmers can now treat as a capital gain any revenue from sales of draft, breeding, or dairy livestock, and they can deduct as current expenses certain outlays for soil or water conservation. Changes have also been made in depreciation rules, with effects on the profitability of new investments in machinery and buildings. Such changes presumably influence the production adjustments indicated by research in farm management and planning. But too frequently the nature and extent of these effects have been ignored both by students of farm taxation and by farm-management experts.

Questions that bear on national policy may also be raised. Is there, for example, any evidence that the higher marginal rates in effect in World War II and the Korean-war years materially restricted agricultural production? Or did the income tax perhaps induce farmers to put forth greater productive effort in an attempt to recoup income lost through income taxation? Investigation of these and many other questions not examined here may yield results that will more than repay the effort.

Examples are retired persons and hired farm laborers. The number of farm operators is not estimated independently, but there is assumed to be one farm operator for each farm.

Internal Revenue Service data offer no solution to the problem of defining the farm population for purposes of estimating income taxes. A casual observer may wonder why, in estimating the impact of income taxes on a selected group of taxpayers, one does not obtain directly from tax collectors the relevant data on the amounts collected. This question arises especially in connection with the Federal income tax, from which detailed and comprehensive statistical reports are prepared. The Internal Revenue Service might be expected to have available among its many tabulations of income tax data a statement of the tax liabilities reported by persons listing their occupations as farming.

That no such tabulation exists may be traced in large part to inherent limitations in the statistical data compiled from tax returns and published in the Statistics of Income. Because these data are assembled primarily to aid in the administrative task of collecting Federal income taxes, they are not always well adapted to incidental jobs such as that of estimating the taxes paid by certain segments of the population. Thus it is perhaps understandable that use of the Statistics of Income for this purpose should involve certain shortcomings.

For example, under present reporting procedures no data can be compiled for such a group as the farm population, or even farm operators. This problem goes back to the difficulty of obtaining uniform and accurate responses on tax returns to the question concerning the taxpayer's occupation. If it were possible to prescribe a standard classification into which each taxpayer could fit himself, one might then draw some inference from statistics of the returns that fall in any particular category. But under the present reporting system there is no guarantee, and indeed little likelihood, that the group listing the occupation "farming" would bear much resemblance to the category "rural farm residents," as used in the Census of Population.

The Statistics of Income published by the Internal Revenue Service supplies several tabulations of schedules that report income from farm businesses. For present purposes, however, these tabulations have two shortcomings. The first is that the group covered by these tabulations bears no apparent relation to the farm population, either as the concept is used in this study, or under any other widely used definition. All schedules that show any income from a farm business are included in this grouping, even though the taxpayer may not live on a farm, and even though his farm income may be an infinitesimal part of his total income. A further deficiency is that farm partnerships are not covered.

A second shortcoming lies in the form of the income-size classification of the schedules. Unless one knows the total income of which the farm income is a part, the applicable tax rate cannot be determined. Consequently, in estimating the tax liabilities of a selected group, it is desirable that the data be grouped according to size of adjusted gross income from all sources, rather than by income from the specific source alone, as has been the practice.

If, in addition to such a classification based on adjusted gross income, the Statistics of Income were to supply further information on the amount and sources of nonfarm income reported on returns showing income from farming, new and valuable light would be shed on the question of the impact of Federal income taxes on farmers.

To summarize, in the absence of any readymade grouping of farm taxpayers based on actual tax returns filed with the Internal Revenue Service, it is necessary to frame a concept suitable for the purpose at hand. The group to which these estimates apply is the rural farm population, which is defined in the Census of Population as those who think of their places of residence as farms. Not all farmers, in the sense of persons who live on such farms, or who operate farms as defined in the Census of Agriculture, are included in this group. Also, some persons are included who are not farmers either in the Census-of-Agriculture sense or even in their own estimation, but who, as in the instance of retired persons, may nevertheless reside on farms. These are important characteristics of the group to which the estimates apply.

Procedure for Estimating "Computed Liabilities" of Farm Population

The procedure followed in estimating the computed liabilities of farm people for Federal income taxes involves as a first step the construction of a distribution of farm population by size of income. More precisely, the task is to estimate the number of taxpaying units that make up the farm population, and to range these units by size of income in such a way as to account for the total taxable income of the farm population, as determined from estimates of the Agricultural Marketing Service.

Concept of the Taxpaying Unit

The assumption that underlies estimation of the number of taxpaying units in the farm population is that, in general, each family, subfamily, or unattached individual constitutes a separate entity for tax purposes. There are, however, no continuous and consistent statistical series giving these three components, and therefore they must be estimated.

The number of farm families and unattached individuals reported in the 1950 Census of Population is used as a benchmark. To construct a series extending back to 1940, reference is made to the series on farm population and to fragmentary data on the trend in average size of farm families. From this information, estimates are prepared of the numbers of farm families and unattached individuals, and to these are added estimated numbers of subfamilies. This series is then adjusted to the level indicated by the 1950 benchmark. The

---

15/ The definitions used in the 1950 Census of Population are as follows: "The term 'family' . . . refers to a group of two or more persons related by blood, marriage, or adoption and residing together; . . . . The term 'unrelated individuals'. . . refers to persons (other than inmates of institutions) who are not living with any relatives." "The term 'subfamily' refers to a married couple, with or without children, or one parent with one or more children under 18 years of age, living in a household and related to but not including the head of the household and his wife."

resulting estimates of numbers of farm taxpaying units for the years 1940-54 are as follows:

Year	Thousands	Year	Thousands
1940	7,270	1947	7,095
1941	7,229	1948	6,686
1942	7,170	1949	6,716
1943	6,754	1950	6,376
1944	6,490	1951	6,188
1945	6,613	1952	6,234
1946	6,923	1953	5,814
		1954	5,640

It should be noted that the number of farm taxpaying units is not the same as the number of people who pay Federal income taxes. Some units have gross income less than the minimum filing requirements, and many more have income that, though large enough to require filing a return, is not large enough to be taxable. The amount of income actually received or of tax paid is irrelevant to this definition. A taxpaying unit represents simply that grouping of individuals whose incomes in all likelihood would be pooled for tax purposes and reported on a single return.

Concept of Taxable Income

The aggregates of income for which the distribution must account are based on estimates by the Agricultural Marketing Service of total income received by the farm population, as this term is defined in the 1950 Census of Population.

To the reported estimate of cash receipts from farm marketings (including Government payments) is added the income of the farm population from nonagricultural sources. From this sum are deducted the estimated amounts of various allowable business deductions. These include current farm operating expenses, cash wages paid to hired workers other than farm residents,[16] depreciation of farm buildings and equipment, farm property taxes, interest on farm-mortgage debt, and net rent to nonfarm landlords (including Government payments). The remainder is the realized net cash income[17] of the farm population from all sources.[18]

---

[16] That part paid to farm-resident workers is not deducted, as it remains part of the income of the farm population.

[17] The Agricultural Marketing Service publishes periodically in The Farm Income Situation statistics on the net cash income of the farm population from farming. The difference between this concept and the one used here, besides the exclusion of income from nonfarm sources, is that the latter is expressed net of outlays for capital equipment, whereas the concept developed for tax purposes is net of depreciation.

[18] The assumption implicit in this procedure - that nearly all farmers report their income for tax purposes on the cash rather than the accrual basis - is probably in close accord with the facts.

Some refinement is in order, however, to eliminate that part of the farm income that is received by corporations. The central objective of the procedure used here is to determine the Federal income taxes that are payable on the total income of the farm population from all sources. This base presumably includes dividends received from stockholdings, which are a component of farmers' income from nonfarm sources. It follows, therefore, that the income of corporate farms must not be included as a part of the income base on which tax liabilities are computed. To do so would result in (1) doublecounting the income of farmer-owned corporate farms[19] and (2) including income earned by nonfarmer-owned corporate farms, dividends from which are not properly regarded as part of the income of the farm population. Therefore, the net income of farm corporations, as estimated by the U. S. Department of Commerce, is deducted from the estimate of total farm income as built up from Department of Agriculture data.

The resulting estimates represent the net income, adjusted to a taxable basis, received by the farm population from all sources. This concept corresponds to what the Internal Revenue Service would term the "adjusted gross income" of the farm population.

Note must be taken of a shortcoming of the basic income data for which no adjustment or refinement has been made. Capital gains and losses, whether long- or short-term, come within the scope of the Federal income tax. Only half of the long-term gains are taxed but short-term gains are taxable in their entirety. Estimates of farm income prepared by the Agricultural Marketing Service, however, exclude capital gains of either kind.[20] As a result, the aggregate income on which tax estimates are based may show some slight downward bias.[21]

Distribution of Taxpaying Units by Size of Taxable Income

The preceding paragraphs have explained the derivation of aggregate taxable income and of the total number of taxpaying units among which this income is shared. These taxpaying units must next be distributed by size of taxable income in such a way that they will account for the estimated aggregate.

Basic data for construction of an income-size distribution of this kind are found mainly in reports of the Bureau of the Census based on the Current Population Survey. This survey, which is taken each spring, yields statistics that show the distribution of farm-resident families and unattached individuals by size of net money income of the preceding year. Usable statistics are

[19] To the extent that the corporate income is paid out to farm residents in dividends. Indications are that the amount of such dividends is small.

[20] This is true of gains or losses from sale of such capital assets as land, buildings, and machinery. Under some circumstances, however, returns from sale of crops or livestock may be received in the form of capital gains. Such income is included in the AMS estimate.

[21] Probably the largest single form of capital gain received by farmers is that realized on the sale of a farm. When such a gain arises, however, it is likely that in many instances the recipient is removing himself from the farm population, and his tax liability on the gain should not be included.

available from this source for each year from 1949 through 1952.22/ For the year 1949, data on the income-size distribution of the farm population are available also from the 1950 Census of Population.23/ The 1940 Census of Population, however, does not show a distribution of this kind for 1939. It shows only the distribution by size of wage or salary income, with a further breakdown showing the number in each wage or salary bracket that have at least $50 in "other" income.

For the year 1941, a joint study of the former Bureau of Human Nutrition and Home Economics of the Department of Agriculture, and the Bureau of Labor Statistics of the Department of Labor, entitled Rural Family Spending and Saving in Wartime,24/ supplies information on the income-size distribution of rural-farm families. No usable statistics are available for any of the years from 1942 through 1948. For these years synthetic income distributions based on the 1941 and 1949 data must be constructed. To do this, some assumption must be made regarding shifts in the shape of the income-distribution pattern. This pattern, as pictured in Lorenz curves, is usually fairly stable. Between 1941 and 1949, the Lorenz curve reveals some shift toward less inequality in the income-size distribution of the farm population. The shift is slight enough, however, to permit the assumption that for most of this period the curve is constant. In the actual procedure, the 1941 Lorenz curve is assumed to apply also to 1940 and 1942, years in which the total taxable income of the farm population does not depart too widely from that of 1941.25/ From 1943 through 1948, the aggregate taxable income is on the same order of magnitude as that of 1949. For this period the Lorenz curve applicable to 1949 is used.26/ In effect, the assumption made at this stage is that the shift between 1941 and 1949 in income distribution, as expressed in the Lorenz curve, is concentrated in the period 1942-43, and that no change occurred during the years 1940-42 and 1943-49.

The use of data from the Bureau of the Census and the 1941 BHNHE study involves an assumption that must be made explicit. The distribution of farm taxpaying units by size of taxable income is assumed to be identical with that of farm families and unrelated individuals by size of net money income. The latter are the two concepts used in the basic data. But each differs in minor respects from the concepts represented by the aggregate income, as estimated by

22/ Data are also available for years as early as 1944. Before 1949, however, the definition of the rural-farm-resident population differed from that used currently. For this reason the earlier data are of limited value for this purpose.

23/ Some problem might conceivably have arisen here had the two census studies produced materially different results for the same year. Although the two population totals differ to some extent, the patterns of distribution by size of net money income (that is, the Lorenz curves) are virtually identical.

24/ U. S. Department of Agriculture Misc. Pub. 520, June 1943. This source gives data also for the first quarter of 1942, but this information is not used here.

25/ Expressed as a percentage of 1941 income, that of 1940 is 74 percent and that of 1942, 143 percent.

26/ Expressed as a percentage of 1949 income, that of 1943, the lowest of any of the 6 years, is 83 percent, while that of 1947, the highest, is 114 percent.

the Agricultural Marketing Service, and the total number of taxpaying units, as estimated above. These are used as control totals.

On the one hand, net money income, although in other respects it is identical with adjusted gross income, includes certain forms of income that are not taxable. Examples are veterans' allowances, social security benefits, and relief payments. Moreover, as noted earlier, capital gains are excluded from the taxable income concept as it is used here, and depreciation may also be accounted differently in determining net income for tax purposes. In general, however, the two concepts are so closely related that little distortion is likely to result from assuming that the distribution of farm population by size of taxable income is similar to its distribution by size of net money income.

The concept of the taxpaying unit, as previously noted, includes sub-families in addition to rural farm families and unrelated individuals. In effect, the procedure assumes that subfamilies are distributed by size of net money income (and by implication, taxable income) as are all families plus unrelated individuals. In view of the relatively small number of subfamilies involved, it seems reasonable to ignore any distortion that this assumption may produce.

Determination of Extent of Coverage of Base-Year Data

Implicit in each of the income-size distributions set forth in census or BHNHE data is a certain aggregate income, which is derived by summing the products of the frequencies in each income bracket multiplied by the estimated mean income of the bracket. As a general rule, the income data of the Current Population Survey, like those of the decennial Census of Population and the 1941 BHNHE study, account for something less than the full amount of income. Understatement of income on the part of respondents need not necessarily be intentional. More probably it results from memory bias, which is likely to work in a downward direction so far as questions relating to income are concerned. In the procedure used here, a further cause for incomplete coverage of the control totals of income may lie in the slight conceptual differences explained in the preceding section.

The derivation of the control total of taxable income of the farm population was explained previously. To determine the corresponding income total implicit in the basic data, an estimated mean must be assigned to each income bracket.

For income brackets that account for all except approximately the top 10 or 20 percent of the income, the mean income is estimated according to a

procedure based on the relation of the frequencies in the bracket to those in the next higher and next lower brackets.[27] For the top brackets, the means are estimated by use of a Pareto curve.[28] The slope, υ, of this curve is determined by the formula

$$\upsilon = \frac{\log\ f_1/f_2}{\log\ x_2/x_1}$$

in which f_1 and f_2 are respectively the cumulative frequencies above the lower and upper limits of the bracket, that is, x_1 and x_2.[29] By substituting x_i for x_2, and using the same formula in the form $\log f_i = \log f_1 - \upsilon(\log x_i - \log x_1)$, it is possible to determine the cumulative frequencies f_i, above any income level, x_i.

Then, by use of the formula

$$\bar{x} = \frac{\upsilon}{\upsilon-1}\left[\frac{x_1 f_1 - x_2 f_2}{f_1 - f_2}\right]$$

the mean, $\bar{x}$, can be computed for the bracket having a lower limit x_1 and the upper limit x_2.[30]

---

[27] The formula used is

$$m_2 = \frac{c_2{}^2\left[\dfrac{f_3}{c_3} - \dfrac{f_1}{c_1}\right]}{12(c_2 + .5c_1 + .5c_3)\dfrac{f_2}{c_2}}$$

in which m_2 is the difference between the mean of the bracket and its midpoint, the subscripts 1, 2, and 3 refer respectively to the bracket below the given bracket, the bracket itself, and the next higher bracket, and c and f refer respectively to the bracket sizes and the frequencies therein.

The formula and the procedure of which it is a part are explained in detail in Income Distribution in the United States, U. S. Department of Commerce, Office of Business Economics, 1953. This publication, which is referred to hereafter as Income Distribution, is the source of many of the statistical procedures used in the study reported here.

[28] The Pareto curve is a linear function relating the logarithms of various incomes to the logarithms of the cumulative frequencies above these incomes.

[29] Because the Pareto curve (plotted on double logarithmic paper) is assumed to have the same slope at all incomes above \$10,000, x_1 and x_2 need not necessarily be the lower and upper limits of any particular class. They may be any pair of income points for which the corresponding cumulative frequencies are known.

[30] Income Distribution, p. 33. For the final open-end bracket, the mean is computed by the formula

$$\bar{x} = \frac{\upsilon}{\upsilon-1}\ x_1$$

These procedures are used to determine the mean income in each bracket in each year for which income-size distribution data are available - that is, 1941 and 1949 through 1952. The products of the mean income of each bracket, multiplied by the frequencies therein, are added to obtain the income aggregate implicit in each of these distributions.

Adjustment of Data to Account for Control Totals

The next step is to adjust the income-size distribution obtained from the basic data so as to account for the correct total of taxpaying units and the correct aggregate income in each of the base years. The assumption that underlies these adjustments is that the corrected distribution has the same Lorenz curve as the original distribution. That is to say, the percentage of frequencies at any given income point, x, in the original distribution is assumed to be equal to the percentage, kx, in the corrected distribution, where the constant, k, is the ratio of the arithmetic mean of the original to that of the corrected distribution. The adjustment, therefore, takes the form of shifting the farm population, at all income levels, along the income scale by a constant proportion.31/

In correcting a distribution for any one year to account for the control totals for that year, this assumption raises little question. In effect, what is assumed is that underreporting of income is of equal proportion at all levels of income.32/

Extension of this assumption to situations in which base-year data of one year are adjusted to produce control totals of another year does, of course, raise some questions. This is done for the years 1943 through 1948, in each of which the distribution is based primarily on the income distribution obtained by the 1949 Current Population Survey, and for the years 1940 and 1942, distributions for which are based primarily on 1941 data. Here the implication of assuming a constant Lorenz curve is that increases or decreases in the mean of the income distribution are reflected proportionately in all income brackets. Although this is certainly a less comfortable assumption than that required for the adjustment of data within a single year, such evidence as is available appears to indicate a high degree of stability in the pattern of income distribution as expressed in the Lorenz curve. In view of the stability, and because the distributions are at all events designed to produce the independently

31/ The method by which this is done is explained in detail in Income Distribution, p. 33. It may be noted also that this procedure assumes that the original data are based on a representative sample. The adjustment process does not correct for sampling bias.

32/ The income-size distribution of the farm population, as reported for 1952 in the Current Population Survey, accounts for a little more than 90 percent of the money income of farm people, as estimated by the Department of Agriculture. The proportion is about the same for 1951 and 1950, but it is only 75 percent for 1949.

estimated aggregate of income, the distortion that results from the assumption of a constant Lorenz curve is thought to be negligible.33/

Summary of Adjusted Distribution

The end product of this procedure is a distribution of farm taxpaying units for each year from 1940 through 1954 by size of taxable income. This distribution has certain noteworthy characteristics that should be borne in mind in evaluating the tax estimates for which it provides the basis.

(1) The income-size distribution (for each year) accounts for the control totals, both of frequencies (that is, the number of farm taxpaying units) and of aggregate taxable income. If the estimates of the control totals are accurate, the chief remaining source of error consists of aberrations in the shape of the distribution pattern. The statistics that are available, however, together with what is known about the general characteristics of income-size distributions, confine this error within fairly narrow limits.

(2) The adjustment of the basic income distributions to account for the control totals is a two-part process, one of which involves redistribution of the frequencies and the other of the aggregate income. This procedure has its own internal check to guard against mathematical errors. If the corrected income obtained in each bracket is divided by the corresponding corrected frequencies, the mean income is obtained. To be plausible, this mean must fall within fairly narrow limits. So long as it falls within these limits, the possibility of error resulting from the process of adjustment is small.

(3) The use of annual data for the more recent years reveals any broad changes that may occur in the pattern of income distribution. By relying on 1941 data for the years at the beginning of the series, further cognizance is taken of such shifts. For the years between 1941 and 1949, however, the absence of usable annual data makes it impossible to take account of whatever changes may have taken place in the Lorenz curve during this period. Nevertheless, the close similarity of the 1941 and 1949 Lorenz curves indicates that these changes were probably not so drastic as to invalidate the assumption of a constant Lorenz curve throughout most of this period.

Estimated Tax Liabilities

The procedure used in estimating the tax liabilities of rural farm taxpaying units with taxable incomes of less than $10,000 parallels the process followed by individual taxpayers in figuring their own taxes. The mean taxable

---

33/ The implications of the assumption of a constant Lorenz curve are discussed in "An Income Size Distribution from Income Tax and Survey Data, 1944," by Maurice Liebenberg and Hyman Kaitz, in Studies in Income and Wealth, vol. 13, National Bureau of Economic Research, 1951, pp. 381-383. In dealing with income data for the farm population, the absence of more refined data virtually rules out the possibility of any method of adjustment other than the simple transformation assuming a constant Lorenz curve. This assumption is, in fact, relied on in adjusting the frequency distribution of farm operator families by family money income level in Income Distribution, p. 65.

Table 5.- Estimated distribution of rural farm population by size of taxable income,1/ selected income years, 1940-54

Income class	Number of taxpaying units						
	1940	1945	1950	1951	1952	1953	1954
	Thou-sands	Thou-sands	Thou-sands	Thou-sands	Thou-sands	Thou-sands	Thou-sands
Under $1,000----	5,241	2,298	2,047	1,517	1,727	1,541	1,578
$1,000-$1,999---	1,537	1,579	1,320	1,325	1,241	1,125	1,128
$2,000-$2,999---	316	1,103	1,139	1,109	1,002	907	914
$3,000-$3,999---	88	768	837	713	796	759	715
$4,000-$4,999---	37	347	394	594	534	511	479
$5,000-$9,999---	41	417	505	761	768	797	679
$10,000 and over	10	101	134	169	166	174	147
Total number of taxpaying units-------	7,270	6,613	6,376	6,188	6,234	5,814	5,640

1/ "Taxable income," as the term is used here, corresponds to the concept "adjusted gross income" used in Internal Revenue Service data.

income (corresponding to the Internal Revenue Service concept of adjusted gross income) is estimated for each bracket. From this are deducted appropriate allowances for nonbusiness deductions and for personal exemptions. The remainder, which corresponds to the Internal Revenue Service concept of net taxable income, is subjected to the appropriate tax rates to determine the tax liability.

The number of taxpaying units with various numbers of allowable exemptions is estimated from data on the distribution of rural farm families within each net money income bracket, by number of family members. Although it is not published, this information is available in the Bureau of the Census tabulations of data from the Current Population Surveys for 1944, 1945, and annually since 1947. The percentage relationships found in the 1944 data are used also for the years 1940-43; those for 1945 are used also for 1946, and 1952 relationships - the most recent available - are used also for 1953 and 1954.34/

34/ These data are used without regard to the fact that the income brackets to which they apply are those of the unadjusted data, and that these relationships may be modified by the adjustment process. It is assumed further that the slightly different concept of the farm population used in the Current Population Survey before 1949 does not affect estimates of the proportions of farm families in each income-size class having various numbers of members.

In calculating the mean net income subject to tax, several assumptions are necessary. These assumptions possess varying degrees of validity.

(1) The mean taxable (adjusted gross) income in every bracket is reduced by an assumed 10 percent to allow for nonbusiness deductions. The exact percentage used is the standard deduction allowed by law on adjusted gross incomes of less than $10,000. Because each taxpayer (with few exceptions) below this level can claim at least 10 percent, this is clearly a minimum estimate. On the other hand, some taxpayers in upper brackets doubtless claim deductions of less than 10 percent of adjusted gross income. This gives rise to an offsetting bias. The evidence, however, is that in most years aggregate deductions slightly exceed 10 percent of aggregate adjusted gross income.

(2) In those years in which earned income credits were allowed, farm taxpayers are assumed to have qualified for the maximum credit. Such a provision was in effect for a number of years until it was dropped in 1944. To the extent that farm taxpaying units qualified for less than the full credit in these years, their net taxable incomes, and hence their taxes, are understated.

(3) No account is taken of the provisions of the law that permit operating losses to be carried forward or backward and offset against net income of other years. The procedure used here assumes that all income is taxable in the year earned and that losses are deductible only in the year in which they occur. In several relatively low-income years in the period 1940-53, such as 1940 and 1949, many farmers must have suffered operating losses. And even in the best years, some farmers lose money. As a result, every year some farmers whose current incomes are large enough to be taxable have losses carried forward or backward from other years, which reduce the amount of their incomes that is subject to tax. In ignoring loss offsets of this sort, the procedure used here introduces an upward bias into the estimates of taxable income and of tax.

(4) All farm taxpayers are assumed to report income on the cash rather than the accrual basis. This is an oversimplification, as no doubt some farmers use accrual accounting. Evidence, however, indicates that among farmers the number of accrual taxpayers is very small, and this assumption accordingly does little violence to the facts. Likewise, the assumption that all farmers report on a calendar-year, rather than a fiscal-year basis, is probably reasonable.

(5) Each taxpaying unit is assumed to be entitled to one exemption per member. Although this may be reasonably accurate in the broad picture, two important exceptions must be recognized. A parent, for example, is deprived of the exemption for a child (other than a student) who earns more than a certain amount during the taxable year. To the extent that this occurs, the assumption biases the estimates in a downward direction. On the other hand, persons who are 65 or over, blind, or both, are entitled to more than one personal exemption. Here the assumption of one exemption per person produces an upward bias in the estimates of net income subject to tax. To some extent, these two sources of error cancel out. In view of the large number of aged persons in the farm population, however, it is likely that the net result of this assumption is to produce too large an estimate of tax liabilities.

(6) Finally, beginning with 1948 the income-splitting option is assumed to apply to all families with two or more members. Before that time, no splitting

of income is assumed. The net effect of this assumption is to overemphasize
the change produced by the split-income provision introduced in 1948. This
option, it will be recalled, was available to taxpayers in community-property
States before 1948. And under present law, many taxpaying units that have two
or more members fail to qualify for income-splitting, because they do not con-
tain a husband-wife combination.35/ The direction of statistical bias
introduced into the estimates of tax liabilities at this point, therefore, is
upward before 1948 and downward from 1948 to date.

On the basis of these assumptions, the net income subject to tax is
calculated each year for the average taxpaying unit with from 1 to 7 or more
members in each of the several income brackets.36/ The appropriate tax rates
are applied to this income, and the resulting estimate of average tax liability
is multiplied by the number of taxpaying units in the particular group. The
results are totaled to give an estimate of the Federal income tax liabilities
of farm residents who have taxable incomes of less than $10,000.

Procedure Used in Brackets Above $10,000

The procedure outlined above may be assumed to be sufficiently accurate
when applied to income brackets of relatively small interval. Intervals of
$1,000 are used for incomes below $10,000, and incomes below $5,000 are sub-
divided further into $500 brackets. Above $10,000, however, bracket sizes are
larger and considerable distortion would result from use of the mean income as
a basis for estimating the tax liabilities of the group. Because of the
graduated rate structure, the average tax on incomes greater than $10,000 is
more than the tax computed at the average income.

To avoid this problem, a special procedure is used to estimate tax lia-
bilities on upper-bracket incomes. This involves selection of a "representative"
taxpaying unit for which the liability is computed. The unit selected is a four-
member family eligible for the benefits of income-splitting.37/ The effective
rate of tax applicable to the representative taxpaying unit is estimated at a
series of equally spaced income points x_1, x_2, . . . x_n, in which n is an odd
number. (In the present instance, x_1 is set equal to $10,000, x_2 to $30,000,
x_3 to $50,000, . . . and x_n to $210,000.)

The formula used in estimating the aggregate tax liabilities, T, on income
between x_1 and x_n (that is, $10,000 and $210,000) is

$$T = \frac{x}{3} \left[y_1 + y_n + 4 \left(y_2 + y_4 \cdots + y_{n-1} \right) + 2 \left(y_3 + y_5 \cdots + y_{n-2} \right) \right]$$

in which x represents the size of the income interval, and y_i represents a ratio,
the numerator of which is the product of the effective tax rate (t) at income x_i,

35/ The head-of-family provision introduced in 1952 partly offsets the distor-
tion caused by assuming income-splitting privileges to be available to all
taxpaying units with two or more members.
36/ Before 1947, data were available only up through the 5-or-more category.
37/ The distortion that results from selecting such a taxpaying unit as repre-
sentative is negligible because of the relatively small difference in tax
liability caused at higher income levels by one exemption more or less.

the slope of the Pareto function (ν) and the number of frequencies (N) above income point x_1, and the denominator of which is $(x_i/x_1)^\nu$.

The frequencies in the rest of the income range above x_n are given by the formula

$$\frac{N}{(x_n/x_1)^\nu},$$

and the result is multiplied by the average tax liability on incomes larger than \$200,000, as reported in the Statistics of Income, to arrive at an esti-mate of the taxes due on these incomes.

Adjustment to Tax Payment Basis

The final step in the estimating procedure presents further questions. The results obtained from the preceding steps represent the computed Federal income tax liabilities incurred by farm people under certain assumptions as to the distribution of this income. But not every taxpayer reports his entire income on his tax return, and many who by law are taxable file no return at all. For most purposes, it is not enough to know how much a certain group would pay in Federal income taxes under certain hypothetical conditions of full reporting and perfect compliance. The important question concerns the amount actually paid.

In bridging this gap, however, reliance must be placed on data and pro-cedures that are clearly inferior to those that underlie the foregoing steps. The degree of precision possible in the results of any statistical process is limited by the weakest of the steps involved. It must be recognized, therefore, that estimates of tax payments are subject to a greater margin of error than are estimates of the liabilities on which they are based. Determination of the proper allowance for imperfect compliance is largely a matter of judgment, the foundation for which is explained in the following paragraphs. The reader who believes some other allowance to be more appropriate is free to modify the final estimates as he sees fit to meet his particular purpose.

In its very nature, the extent of noncompliance with the income tax law is hard to determine, and particularly so for a selected segment of the total population. Nevertheless, several sources of data bear on this subject. The Audit Control Program, undertaken by the former Bureau of Internal Revenue, is the source of what is probably the most important body of information relating to this subject. This study, which covered the years 1948 and 1949, developed data to show the number of returns, the amount of adjusted gross income, and the tax liability reported in each of several categories, together with informa-tion on tax errors on returns in each group.38/ From the published results of this study, the amount of tax voluntarily paid on all form 1040 returns can be estimated at about 84 percent of the full amount that would be disclosed if all

38/ For a more comprehensive description of the study, see Marius Farioletti, "Some Results of the First Year's Audit Control Program of the Bureau of Internal Revenue," National Tax Journal, March 1952, pp. 65-78, and "Sampling Techniques in Auditing: the Audit Control Program of the Bureau of Internal Revenue," Pro-ceedings 44th Annual Conference of the National Tax Association, 1951, pp. 54-69.

such returns filed were audited.39/ This estimate does not take into account the taxable incomes on which no returns were filed.

As noted earlier, it is reasonable to assume that compliance on the part of the nonfarm population is somewhat better than on that of farm people. It may be well to review briefly several considerations that point in this direction. Self-employment income, which is not subject to withholding, accounts for a larger share of total income of the farm population than of the nonfarm. Moreover, in the main, farm people are members of lower income brackets, and the Internal Revenue Service finds it relatively unprofitable to expend a great deal of effort on auditing returns and enforcing payment in such brackets. Third, many farmers' accounts and records are so inadequate that determination of taxable income and of tax due is almost impossible for either the taxpayer or the tax collector. Finally, the nature of farming as a business, in which personal expenses are intermingled with business expenses, creates special difficulties in the reporting of income of farm residents. In light of these considerations, it appears that the estimate of 84 percent referred to above probably sets a generous upper limit to the range within which such a ratio for the farm population is likely to fall.

A second source that bears on the extent to which farmers comply with the tax law in reporting their incomes and tax liabilities is a study in which are presented estimates of the percentages of various forms of personal income accounted for in Federal income-tax returns.40/ It is found, for example, that in 1945 individual income tax returns accounted for 95 percent of civilian wages and salaries, 87 percent of nonfarm entrepreneurial income, 44 to 45 percent of rent (excluding roomer-boarder income) and 36 percent of farm income.41/

By combining the data from this source with data on the types of income received by the farm population, and by making certain limiting assumptions with respect to the income tax reporting practices of farm people, it is possible to estimate the total income actually reported by farm people in some base year. This estimate may then be multiplied by an estimate of the average effective tax rate applicable to farm income. The latter is based on the Statistics of Income, with attention given to the relation between the mean income of farm people and that of the population at large. Using an effective tax rate of 7.5 percent, as derived by this process, the actual tax payment of farmers on income received in 1950 can be estimated at approximately $750 million, or about 65 percent of the computed liabilities.

A third approach to the problem relies on the Commerce Department study of Income Distribution which gives estimates (p. 85) of the ratio between tax payments and family personal income for various income brackets for the year 1950. These ratios, or effective tax rates, may be multiplied by the total

---

39/ The Audit Control Program, U. S. Treasury Department, Bureau of Internal Revenue, May 1951, p. 10.

40/ Goldsmith, Selma F., "Appraisal of Basic Data Available for Constructing Income Size Distributions," in Studies in Income and Wealth, vol. 13, National Bureau of Economic Research, 1951, pp. 267-277.

41/ Ibid., pp. 301-302. It must be noted, however, that comparisons of farm income based on Internal Revenue data are necessarily rough, mainly because of differences in the definition of income. See Income Distribution, p. 65, f. 5.

adjusted gross income, as estimated in the procedure used here, to determine the tax payments that farmers would make if the effective tax rates applicable to income of the farm population could be assumed to equal those applicable to income of the population at large.

This process, applied to 1950 data, yields an estimate of tax payments of $1,025 million, or about 89 percent of computed liabilities. In fact, all evidence points to a ratio for the farm population that is somewhat lower than that for the entire population. Therefore, the ratio that results from this process, even more than the estimate based on the audit study, must be regarded as setting an upper limit.

The Statistics of Income is still another source that bears on this problem, although it is of dubious value for this purpose. In recent odd-numbered years, the Internal Revenue Service has tabulated schedules showing income from farm business, grouping them according to size of reported net profit from farming. As noted earlier, however, the universe represented by these data differs conceptually from the farm population as defined for present purposes, and the usefulness of data from this source is limited.

When account is taken of all the bits of information that may be gleaned from these various sources, a considered judgment suggests that the appropriate ratio for the income year 1949 is in the neighborhood of 0.70. This represents the proportion of farmers' computed liabilities for Federal income taxes that may be assumed to be reported and paid.

If this ratio may be used for the benchmark-year 1949, ratios may then be estimated for the other years. Several possibilities exist. For example, this ratio might be used each year. This procedure would have the advantage of minimizing the distorting effect of possible errors in computing the ratio. It would probably involve even more serious distortion, however, by ignoring certain known facts concerning the influences that determine the extent to which income is reported for tax purposes.

The Goldsmith study cited earlier points out that income from farming is much less fully reported on tax returns than is income from wages and salaries or from nonfarm entrepreneurial sources. This would indicate that in years when the proportion of income of the farm population coming from farm sources is greater than it was in 1949, the ratio should be somewhat less than 0.70 and conversely for years with smaller proportions of farm income.

A further consideration is the probability that there was some long-run improvement in farmers' compliance with the Federal income tax in the 14-year period covered in this study. Such improvement would result partly from increased awareness of income taxes, which usually accompanies increasing income, partly because of improved account keeping, and partly also because of more vigorous enforcement.

These arguments appear to point toward assuming a lower ratio of payments to computed liabilities for the earlier than for the later years. Assuming a ratio of 0.70 for 1949 and adjusting the raw data to this level, reference alone to the changing proportions of income from farm and nonfarm sources would indicate ratios on the order of those shown in table 6, column 1. Some further

Table 6.- Estimated ratios of tax payments of the farm population
to computed tax liabilities, 1940-54

Income year	Unadjusted estimates	Assumed adjustment for improvement in compliance	Adjusted estimates
1940-----------	0.82	-0.12	0.70
1941-----------	.76	-.06	.70
1942-----------	.71	-.03	.68
1943-----------	.69	-.02	.67
1944-----------	.69	-.01	.68
1945-----------	.69	-.01	.68
1946-----------	.66	---	.66
1947-----------	.65	---	.65
1948-----------	.68	+.01	.69
1949-----------	.70	+.01	.71
1950-----------	.72	+.02	.74
1951-----------	.70	+.02	.72
1952-----------	.74	+.03	.77
1953-----------	.74	+.03	.77
1954-----------	.75	+.04	.79

approximate adjustment such as that shown in column 2 of table 6 seems appropriate
to allow for gradual improvement in compliance. These adjustments assume that
compliance was much poorer on wage and salary income before 1943, the year in
which withholding was introduced.42/ On the other hand, the high level of per-
sonal exemptions allowed in the early years of the series operated to exempt all
but comparatively well-to-do farmers from income taxation. Presumably these
farmers keep better records of income and expense. Accordingly it is not
unreasonable to believe that farm income was more fully reported in those years
than it was later when more of the smaller incomes became taxable. This accounts
for the relatively high ratios of tax payments to computed liabilities estimated
for 1940 and 1941 (table 7).

In concluding the discussion of these estimates it is well to reemphasize
the tentative nature of the final step. When circumstances permit, the user of
these estimates would be well advised to use the estimates of computed liabili-
ties rather than the estimates of payments. For those problems for which it is
essential to rely on estimates of payments, the user must bear in mind that the
ground on which he treads is less than perfectly solid.

42/ Withholding does not apply to income from farming, but it is assumed to
apply to the bulk of the income received by farm people from sources other than
farming.

Table 7.- Computed Federal income tax liabilities and payments
of the farm population, income years 1940-54

Income year	Computed liabilities 1/	Adjustment factor (table 6)	Tax payments 1/	Year of payment
	Million dollars		Million dollars	
1940------	25	0.70	15	1941
1941------	120	.70	85	1942
1942------	585	.68	400	1943
1943------	1,315	.67	880	1944
1944------	1,600	.68	1,090	1945
1945------	1,560	.68	1,060	1946
1946------	1,510	.66	995	1947
1947------	2,100	.65	1,365	1948
1948------	1,395	.69	965	1949
1949------	1,160	.71	825	1950
1950------	1,170	.74	865	1951
1951------	1,645	.72	1,185	1952
1952------	1,820	.77	1,400	1953
1953------	1,860	.77	1,430	1954
1954------	1,415	.79	1,120	1955

1/ Rounded to nearest $5 million.